



Naval Center for Cost Analysis

Cost Research & Tools Division

FY12 Cost Research Status Brief

2012 ADoDCAS Navy Day

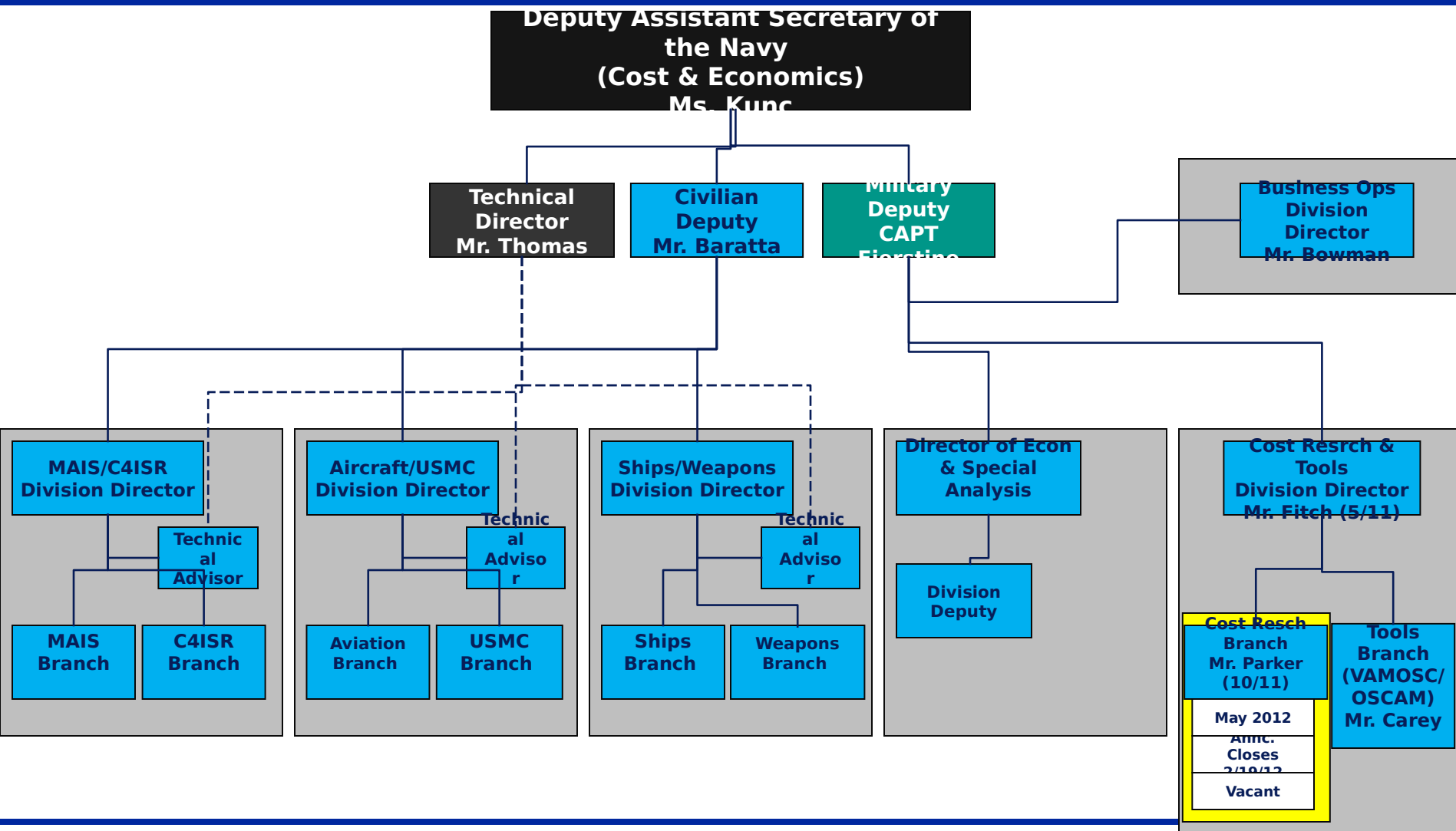
17 Feb 2012



- Background
- NCCA Cost Research Programming Process
- FY11 Research Priorities & Program Update
- FY12 Research Priorities & Program Update
- What is next



NCCA Org Chart 2012





Background: Mission

- Cost Research Branch mission
 - Develop & Execute cost research program that addresses needs of Naval Cost Estimating Community
 - Improve efficiency and capability through development and enhancement of databases, models, and cost methodologies
 - FY11/FY12 Cost Research programs
 - Developing cost research roadmap
 - Liaison with other DON activities, OSD, and other Services to promote joint cost research efforts & foster sharing of results
 - Raise awareness of available methodologies and data
 - Develop & Maintain internal NCCA standards for documentation and cost data & research repositories



Background: Getting Started

- NCCA actions to develop cost research arm
 - Stood up cost research branch late 2010
 - Established Cost & Economic Analysis Research Board (CARB) Apr 2011
 - Forum for proposing, discussing, prioritizing projects
 - Forum for briefing projects back to estimating line organization & getting feedback
 - Establish FY11/FY12 programs Jun-Sep 2011
 - Hired new Cost Research Branch Chief, Bruce Parker, Oct 2011
 - 27 years of experience at NAVSEA
 - NAVSEA Ship System's Division Head
 - Filling positions
 - Open GS-14 (series 1515) announcement, closes 2/19/2012



Background: FY12 Goals

- Staffing branch with mix of hard workers with cost research, IT, and project management skills
- Expand liaison with Navy cost estimating organizations
- Execute FY11 and FY12 programs
- Establish FY13 program
- Developing long-term research roadmap
- Develop modern vehicles for spreading knowledge of cost estimating databases and methodologies
 - Internal: re-organizing NCCA shared drive
 - External: update cost research library and start wikipedia
- Establish learning process by updating NCCA documentation standard and reviewing past estimates for lessons



NCCA Cost Research FY12 Annual Programming Process

Call for Research Proposals

Aug 2011

Proposals include

- Title
- Topic
- Objective
- Data Sources
- Resources
- Use

Proposals solicited
from
NCCA Technical
Advisers, Division
Directors, and Branch
Heads

Next year, we will
invite SYSCOMs to

Cost Analysis Research Board

Chaired by

Technical Director

First meeting to
review and discuss
proposals

All participants
rank projects in
priority order

Program drafted
based on rankings

Second meeting to
discuss/iterate
draft program

NCCA Leadership Review

Late Sep 2011

Cost Research
Branch reviews
draft program
with NCCA
leadership

Adjust for
leadership
priority/direction

Establish Final
Plan

Execute Annual Program

Oct 2011-end of

PoPs

Cost Research

Branch
executes program
-w/ sponsor, draft
SoWs from
proposals
--Task
--Deliverable
--Schedule
-Establish team
-Execute projects
-Deliver products
-Brief results

**CARB programming process allocates NCCA research resources
CESG manages Navy inter-organizational standardization and**



FY11 Program

- Cost Analysis Research Board Rankings
 - Electronics Subsystem Database Enhancement
 - UAV Database Update and Expansion
 - JCARD
 - Software Maintenance Database Enhancement
 - Using SARs for Risk Analysis Benchmarking

- We also cover Air OSCAM v4.0, managed by NCCA cost tools branch



Electronics Subsystem Database Enhancement

- Title: Navy Avionics Subsystem Data Collection Effort
- Scope: Detailed Data collection (cost, technical, programmatic) for ALQ-218, ALQ-214, ASQ-228, ALR-67(V)3
- Deliverables: Update of C4ISR Database (ACDB) & annotated Excel spreadsheet of new datapoints
- Period of Performance (PoP): Aug 2011-



ALQ-218 Tactical Jammer Receiver
<http://www.es.northropgrumman.com/solutions/alq2>
18/



ASQ-228 ATFLIR
US Navy photo



Electronics Subsystem Database Enhancement

- What motivated this project?
 - Leveraging historical cost data for electronic subsystems often requires cost data at Shop Replaceable Assembly (SRA) level
 - New systems often leverage/modify previous capabilities and add new ones
 - Hardware/Software changes
 - Different packaging/partitioning of hardware functions also presents challenges
 - Many electronics CERs end up at SRA or LRU level as a result
 - SRA replaceable cards
 - LRU antennas or SRA antenna components
 - Many analysts use SRA/LRU costs to extrapolate cost of future systems
 - DoN LAIRCM data set has been useful
- Challenge
 - Infrequent CSDR reporting on electronics ACAT I programs often not at SRA level
 - Platform CSDR reporting at ACAT I level often do not report electronics data
 - More electronics programs at \leq ACAT 2, but no CSDR requirement
 - CSDR requirement for future ACAT 2s in theory possible, but need historical data until that happens
- Result—Electronics Subsystems Database Enhancement Project



Avionics

- Focusing on ALQ-218 and ASQ-228
- Working with NAVAIR 4.2

	ALQ-218 (TacJamRcvr)	ASQ-228 (ATFLIR)
Technical Data		
System Description	Have	Have
Technical Parameters	Have	Some, more requested
Programmatic Data		
CARD	Have	Doesn't exist
TEMP	Have	Have
Schedule	Have	Have
Contracts List	Requested	Have
Cost		
Development		
Contractor	CCDRs, Lab Hrs, requested CPRs	Have CPRs, requested final
Government	Requested PO staffing, Testing	Requested PO staffing
A/C Integration	Have F18G CCDCR	Have F18 CPR. Add'l ktr?
Production		
CCDRs	Have LRIP2 and FRP, requested LRIP1	Have
Contract Schd Bs	Requested	Requested
Logistics		
Description & Cost	POC ID'd	Requested



Avionics Successes & Challenges

- Successes & New ideas
 - Great cooperation from NAVAIR 4.2
 - Large data drop on ALQ-218
 - Normal data sources (CSDRs, CPRs, etc)
 - Detailed drop of contractor SDD labor hours- map-able to SRA level
- Challenges
 - Additional data needed from NGC on AN/ALQ-218
 - SDD
 - Materials by SRA,
 - Technical data (equivalent quantities, s/w metrics),
 - Follow-up questions on labor hour data
 - Production—labor/material by SRA

Detailed data collections can be rewarding, but require in-depth dives



UAV Study Overview

- Title: Unmanned Aerial Vehicle (UAV) Database and Parametric Model Research
- Scope: UAV Data Collection and Learning Curve Analysis
 - To collect, organize, and analyze cost, technical, and programmatic data associated with completed and on-going UAV programs within the DoD
 - Capture additional lots and new programs since previous work in 2008
 - Develop raw and normalized UAV cost, technical, and programmatic data sets, including ground stations and sensors (at a high level)
 - Evaluate production learning curves
 - Add unmanned airship data points
 - CER and cost estimating handbook development option possibilities starting in Mar 2012. Additional data collection/normalization likely.
- Deliverables: Database, Documentation, Learning Curve Analysis
- Period of Performance (POP): Aug 2011-

NCCA and DASA-CE provided funding. Receiving strong data collection support from NAVAIR, AFCAA, ASC, AMCOM, and SMDC



UAV Data Collection Priorities

System	Prime Ktr	Lead Service
Global Hawk (RQ-4)	NGAS San Diego	Air Force
Predator-A (MQ-1)	GA-ASI Poway	Air Force
VTUAV (Firescout) (MQ-8)	NGAS San Diego	Navy
Reaper (Predator-B) (MQ-9)	GA-ASI Poway	Air Force
Hunter (RQ-5)	NAnalystGAS	Army
Pioneer (RQ-2)	Textron AAI Hunt Valley	Navy
Shadow (RQ-7)	Textron AAI Hunt Valley	Army
Scan Eagle	Insitu	USMC
N-UCAS (X-47B)	NGAS San Diego	Navy
BAMS (MQ-4)	NGAS Bethpage	Navy
LEMV	NGAS	Army
HALE-D	Lockheed Martin	Army
J LENS	Raytheon	Army
Grey Eagle (MQ-1C)	GA-ASI Poway	Army
Hummingbird (A160) (YMQ-18)	Boeing	DARPA
Global Observer	AeroVironment	Army

- Color-coded programs show priorities

- Contractor has NDAs for most programs

- Met with program offices

- Assistance from Aviation IPT

- Data collected for multiple programs, with others still in work

- Prototype development and production cost data sets provided and feedback given

- Technical parameter



Deliverable

- Excel Cost and Technical Data Set
 - Raw data (always provided)
 - CSDRs, CPRs, CSSRs, and other contractor provided data
 - Data normalized for all systems to standardized WBS
 - Using old MIL-HDBK-881A, as current CSDR plans map to this. Will study remapping to new STD
 - Service inflation indices
 - Technical data
 - Standardized form developed with aid of industry expert
- Happy to share progress and get feedback from government analysts
- Learning curve analysis



UAV Successes & Challenges

- Successes & New ideas
 - Great cooperation from service systems commands and PEOs (thanks to Air 4.2, AFCAA, and DASA-CE)
 - Using Aviation IPT for POCs and top-level information
- Challenges
 - NDAs-Necessary, but time-consuming
 - Using aviation IPT for detailed data



VTUAV in flight
http://www.navy.mil/view_single.asp?id=25693

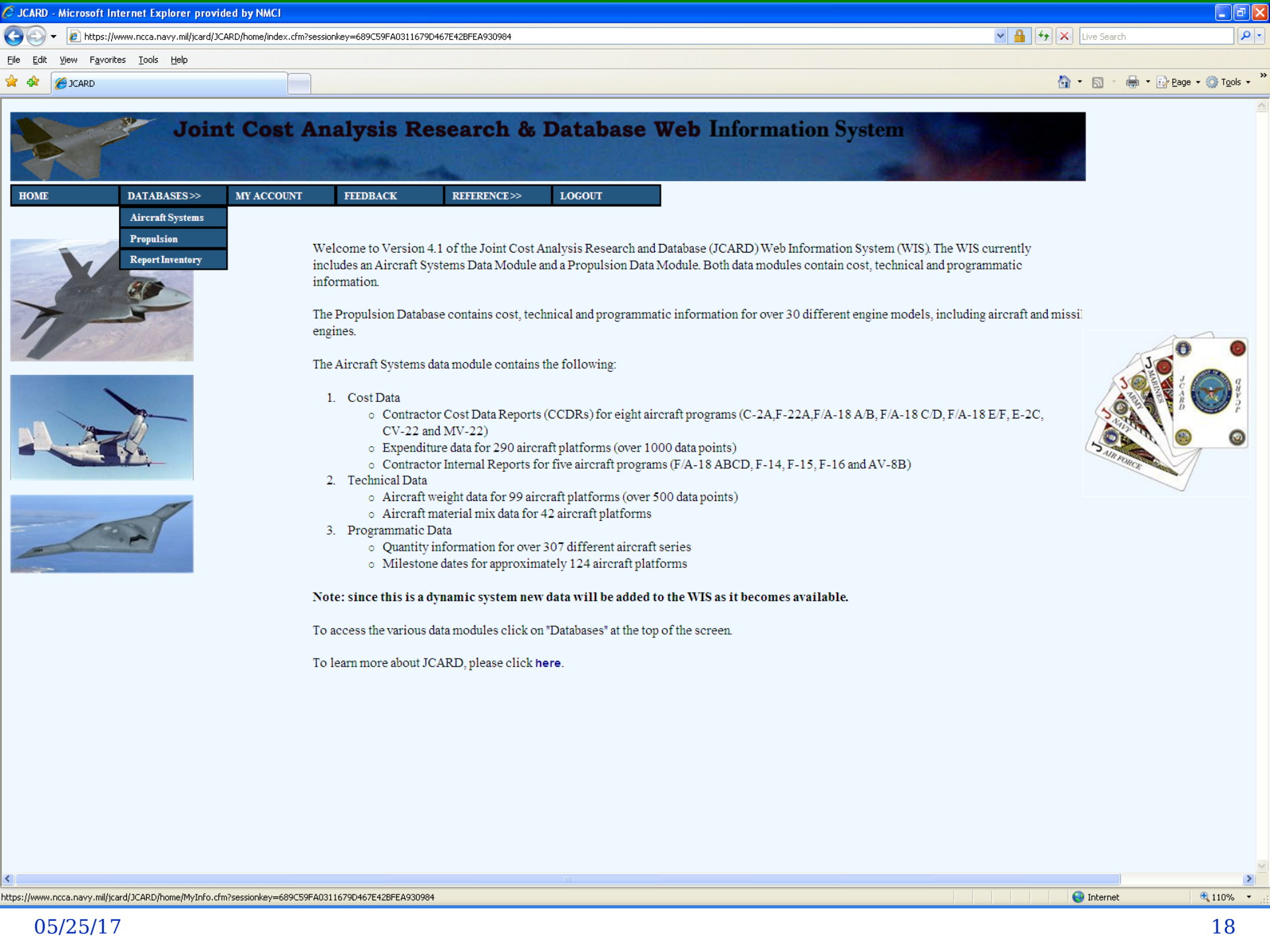
Effort gathering momentum with data coming in. Will likely need several months to exploit momentum into a data update that takes full advantage of the support we are getting



JCARD

- Title: Joint Cost Analysis Research and Database Web Information System
- Scope: Online repository of aviation cost, technical data, and programmatic data
 - Aircraft Cost data (exportable to Excel)
 - CCDR by lot, corrected and annotated by JCARD and program office cost analysts
 - Procurement expenditure data, pulled from NAVAIR ERP system and shown by T/M/S, broken out into P-1 sheet level of detail
 - In-house data from aviation contractors
 - Aircraft Technical data
 - Weight data for both Navy & Air Force aircraft
 - Performance data
 - Aircraft programmatic data-milestone dates for major aircraft programs
- Deliverables: Online database, CAC-card accessible to govt with approved account
- Period of Performance (POP): Oct 2011-Sep 2012

NCCA, AFCAA, ASC, and NAVAIR 4.2 have been supporting development since 2004 with funds and staff





GROWTH OF JCARD SYSTEM



Prototype/ Official
Stand-up of JCARD
WIS

CAC ENABLED →

- Aircraft Systems Data Module**
- Cost Data
 - CCDRs for 2 TMS (F/A-18 EF, F-22)
 - Technical Data
 - Weight Data for 2 TMS (F/A-18 EF, F-22)

FY06

- Aircraft Systems Data Module**
- Cost Data
 - CCDRs for 2 TMS (F/A-18 EF, F-22)
 - Navy Expenditure Data (287 TMS)
 - Technical Data
 - Weight Data for 2 TMS (F/A-18 EF, F-22) Add'l 53 TMS integrated

FY07

- Propulsion Data Module (Cost, Tech, Prog) >30 Eng Models**
- Aircraft Systems Data Module**
- Cost Data
 - CCDRs for 2 TMS (F/A-18 EF, F-22)
 - Navy Expenditure Data (287 TMS)
 - Technical Data
 - Weight Data (55 TMS) Add'l 4 TMS added
 - Mat'l Mix data (44 TMS)
 - Programmatic Data
 - Quantity Data (244 TMS)
 - Milestone Dates (30 TMS)

FY08

- Propulsion Data Module (Cost, Tech, Prog) >30 Eng Models**
- Aircraft Systems Data Module**
- Cost Data
 - CCDRs for 2 TMS (F/A-18 EF, F-22) Add'l 3 TMS
 - Navy Expenditure Data (287 TMS)
 - Internal Reports (MACDAR Data)
 - Technical Data
 - Weight Data (59 TMS)
 - Mat'l Mix data (44 TMS)
 - Technical Charac (105 TMS)
 - Programmatic Data
 - Quantity Data (244 TMS)
 - Milestone Dates (30 TMS)

FY09

- Report Inventory**
- Propulsion Data Module (Cost, Tech, Prog) >30 Eng Models**
- Aircraft Systems Data Module**
- Cost Data
 - CCDRs (5 TMS)
 - Navy Expenditure Data (287 TMS)
 - Internal Reports (MACDAR Data) New section added w/ add'l reports
 - Technical Data
 - Weight Data (59 TMS)
 - Mat'l Mix data (44 TMS)
 - Technical Charac (105 TMS)
 - Programmatic Data
 - Quantity Data (244 TMS)
 - Milestone Dates (30 TMS)

FY10

- Report Inventory**
- Propulsion Data Module (Cost, Tech, Prog) >30 Eng Models**
- Aircraft Systems Data Module**
- Cost Data
 - CCDRs (10 TMS) Add'l 5 TMS
 - Navy Expenditure Data (290 TMS)
 - Internal Reports (5 platforms)
 - Technical Data
 - Weight Data (59 TMS) Air Force Weight Data added (10 TMS)
 - Mat'l Mix data (44 TMS)
 - Technical Charac (105 TMS) UAV data added (10 TMS)
 - Programmatic Data
 - Quantity Data (244 TMS)
 - Milestone Dates (30 TMS) UAV data added (10 TMS)

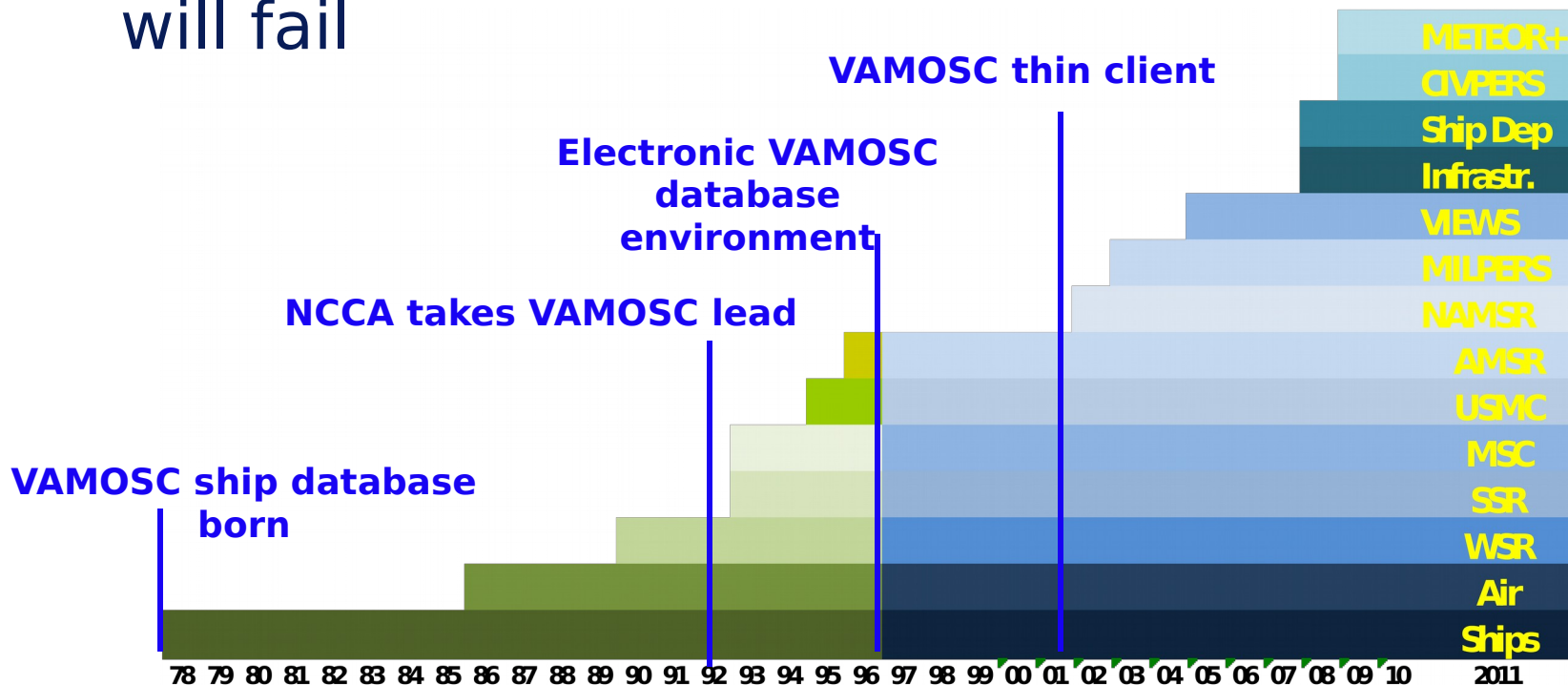
FY11



Establishing the FY12 program

Cost Databases: A Warning

- Cost databases require sustained commitment over time. If we think this is a 1-year effort, we will fail



VAMOSC: 33 years, sustained commitment



JCARD FY11 Accomplishments

- **Three production releases in FY11**
 - **Data Integration efforts (10% growth seen in terms of number of records added)**
 - **24 Lots CCDR data**
 - **131 Lots aircraft weight data**
 - **15 new platforms added to milestone database**
 - **4 new platforms added to tech characteristics**
 - **Sustainment efforts**
 - **Aircraft systems data module**
 - **Cost, Technical and Programmatic Sections Updated with latest data points for platforms already in database**



FY12 Tasking Plan



- **Database sustainment efforts**
 - **Aircraft Data Module**
 - **CCDRs, Expenditures, Weights, Material Mix, Quantity, Milestone Dates**
- **Database development efforts**
 - **Unmanned Air Vehicles (UAV) cost, technical and programmatic data**
 - **Continue integration of Air Force Weight Reports**
 - **Integration Air Force President's Budget Data**
 - **Navy R&D Expenditure data**
 - **Development of a Missile Data Module**
 - **Missile expenditure data from the Navy ERP financial System**
 - **Integration of 273 JCARD Ready Data Templates**
 - **Cost, Technical and Programmatic data**



Software Maintenance Summary

- Title: Software Maintenance (SW MX) Data Collection Study
- Scope:
 - Joint effort between AFCAA and NCCA to collect actual data from different organizations to improve software maintenance cost estimating.
 - Efforts include conducting a feasibility study to identify software maintenance projects and data sources within the DoD and collect data on software maintenance project(s) from three to five software support activities (government or system developer).
 - The data will be collected using a standard Software Maintenance Collection Form approved by AFCAA and NCCA.
- Deliverables:
 - Feasibility Study Report [draft complete]
 - Standard SW Maintenance Data Collection Form with a back-end Excel database table structure [complete]
 - A populated database with SW maintenance data from various maintenance organizations (government and contractor) identified by AFCAA and NCCA [in progress]
- Period of Performance (PoP): Jan-Mar 2011 / Sep 2011-



Status of Data Repository

Participant	Service	Operating Environment	POC	Collection Date	Data Points
Warner-Robins Air Logistics Center	Air Force	Ground, Air	David Fersch	Nov-09	8
Picatinny Arsenal	Army	Ground	Cheryl Jones	Mar-11	19
Ogden Air Logistics Center	Air Force	Air, Ground	David Webb	Aug-11	53
AFCAA	Contractor 1	Space, Ground	Unnamed	Recent	7
AFCAA	Contractor 2	Air (rotary wing)	"	"	10
AFCAA	Contractor 3	Space	"	"	5
AFCAA (STRATCOM)	Contractor 4	Ground	"	"	2
AFCAA (STRATCOM)	Contractor 5	Ground	"	"	2
AFCAA (STRATCOM)	Contractor 6	Ground	"	"	1
NAVAIR (Pt. Magu/ Cherry Pt/ China Lake)	Navy	Air	Lorenda Walton	Dec-11	54
NAVSEA	Navy	Sea	Senthil Arul	Dec-11	
SPAWAR 1.6	Navy	C4I, AIS	Need POC		
Joint Strike Fighter (JSF)	DoD	Air	Don Snyder		
MARCORSYSCOM	Marine Corps	Ground/Air/Sea	LtCol Karl Stuetzer	Feb-12	0
Aviation Cost Integrated Project Team	Contractor	Air			



SW MX Successes & Challenges

- Successes & New ideas
 - Great cooperation from service systems commands and PEOs (thanks to AFCAA, Air 4.2, and ARDEC)
 - Aviation CIPT considering SW Maintenance Subgroup
 - Should we join AFCAA as USC CSSE affiliate?
 - **Requires an investment**
 - **Access to USC experts, annual mtg on industry status, special portal**
- Challenges
 - NDAs-Necessary, but time-consuming
 - Standardizing data definitions
 - SW Data is still not being collected, VAMOSC collects some \$s

After this data collection period, will likely need several months to analyze data to determine best cost estimating methods.



SAR Cost Growth Study

- Title: Selected Acquisition Report (SAR) Cost Growth Research
- Scope:
 - Tool to easily display, annotate, compare, and benchmark probabilistic cost estimates (S-curves), the need for which is driven by the systematic understatement of variability observed in DoN estimates
 - Conduct risk research based on detailed SAR database to result in definitive study of coefficient of variation (CV) for DoD programs
- Deliverables:
 - S-Curve Tool and Documentation [delivered]
 - SAR Cost Growth Database [designed and expanded]
 - SAR Data Collection and Normalization [DoN and Army programs]
- Period of Performance (PoP): Oct 2010-Mar 2011 / Apr-Jun 2012

Posterboard brief



OSCAM

- Title: Operating and Support Cost Analysis Module (OSCAM)
- Scope: Enhance, support, and train OSCAM
 - OSCAM is a suite of models covering Ships, Aircraft, and Shipboard Systems
 - JSF has also sponsored a JSF OSCAM model managed by the JSF SPO
 - Various other sponsors MoD (land), USMC (EFV), C-17 (AF) over time
 - Support and train OSCAM model suite
 - Ship training held Oct 2011, Feb 2012
 - Air training held Feb 2012
 - Ship OSCAM v8 released last year
 - Air OSCAM v4 update now undergoing test, forecast release Sep 2012
 - Research & model business practices, enhance usability
- Deliverables: Help desk support, training & materials, Air OSCAM v4.0



Air OSCAM v4.0 enhancements

- OSCAM Air v(4.0) is currently under development and is expected to be released in September 2012
- Greater fidelity:
 - All business rules and processes have been revisited and updated to reflect current Navy business practices
- Better user friendliness:
 - Undo/redo functionality
 - Improved aircraft introduction and allocation to environments
 - Ability to specify average flying hours per aircraft or prescribed flying hours by environment
 - Ability to input personnel by rate/rank

Have Demo CD available for Ship v8 and Air v3
See us after briefing



Air OSCAM v4.0 enhancements con't

- Expanded input capabilities:
 - Improved CLS inputs
 - Expanded maintenance inputs specific to engines
 - New sector dedicated to UAS specific information
 - Expanded inputs for training information
- Improved output capabilities:
 - Ability to map throughput costs to a specific inflation index and results line
 - Inputs and results aligned to the 2007 CAPE O&S Structure
 - Results can be mapped into a "color of money" table to track appropriations

Have Demo CD available for OSCAM Ship v8 and Air v3
See us after briefing



2012 NCCA Cost Analysis Research Board Results

- 22 projects proposed
- Cost Analysis Review Board ranked projects

FY12 Cost Research Rankings	
Rank	Title
1	Overhead Rate Database/ Estimation
2	SPAWAR Cost Database
3	Avionics Subsystem Data Collection (Continued)
4	NCCA Shared Drive Structure
5	J CARD
6	Researching SW Maintenance Efforts and Cost (Continued)
7	Reserching Help Desk Staffing, Workload, Efforts, and Cost
8	FY12 SEA 05C Information Management System (IMS) Improvements

- Drafted FY12 program & added CV study update
- Late February mid-course review to reflect FY11 progress, opportunities, and budget. With CR over, we can do new starts



Establishing the FY12 program

Cost Databases

- Cost Databases continue to lead research priorities

- Contractor overhead database (#1)
- SPAWAR database (#2)
- Electronics subsystems (#3)
- JCARD (#5)
- SW Maintenance (#6)
- IMS (#8)

- Strong interest from DoN cost community

- Significant and enduring NAVAIR support for JCARD
- Strong interest from NAVSEA in getting NCCA to fund update to IMS
- NCCA research priority rankings

- Most desirable cost databases (but focus is getting data points in existing shells)

- Ease of use & update, online
- Relational
- Ability to research and annotate data anomalies

- Recommendations

- Form Navy cost data management working group with SYSCOM participation
 - Develop common data management practices/participate in ECMF (Navy govt acct structure)
 - Leverage common IT solution
 - Support SYSCOM/NCCA SME review/annotation of data (w/ ourselves and w/ DCARC)
- Seed/support SYSCOM database development as well as data collections

**Improved cost/schedule
databases**

-Extend shelf life of data

**-Improve cost estimator
capability & efficiency**

-Better cost methodologies

-Better decisions



Road Ahead

- Complete FY11 projects
 - Review draft deliverables
 - Approve final deliverables
 - Brief results
 - Adjust FY12 program as appropriate
- FY12 projects
 - Listen to feedback from CARB and FY11 execution-Feb 2012
 - Update NCCA management-Feb 2012
 - Execute
- Expand liaison with DoN and other OSD/brief projects
 - Met with NAVSEA mid-2011
 - Cooperation with Air 4.2 on individual projects, but need to sit down and show whole program
 - Meet with SPAWAR/MARCORSYCOM
 - Lead/participate in OSD cost research collaboration efforts (CAPE/MDA)
 - Develop relationship with Army and Air Force
- Develop our cost research sharing tools
 - DoN cost library and develop wikipedia tool

A lot to do for full time branch chief and part-time division chief-but we're excited about opportunity to really help DoN cost community



- Thank you for all your help & support on various projects
- Keep talking to us, telling us what you are doing & what you need
- FY13-FY15 are going to be tough years
 - We will have to share limited resources and fence off our government staff for research
 - Our country and our Navy & Marine Corps come before everything else